No II.

ENGLISH OPIUM.

The premium of THIRTY GUINEAS *was this Session presented to Messrs.* COWLEY *and* STAINES, *Surgeons, of Winslow, Bucks, for cultivating* FOUR ACRES OF THE WHITE POPPY *(Papaver somniferum), and extracting therefrom, 60 lbs. of* SOLID OPIUM, *equal to the best Turkey Opium. The following communication has been received from the Candidates; and specimens of the Opium, of the Poppy-seed, and of the Oil, together with the implements employed in the cultivation of the plants, and extraction of the Opium, have been placed in the Repository of the Society.*

SIR; Winslow, Bucks.

IN consequence of a premium being offered by the Society for Encouraging Arts, Manufactures, and Commerce, for the cultivation of the *papaver somniferum*, for opium, we are induced to communicate an account of our experiments on that plant, for the perusal of the Society.

Reading of the method employed in the year 1794, by Mr. Ball, of Willison, and perceiving that it had received the approbation of the Society, we became desirous of trying his process, and did so on a small scale, in several seasons; but although we never failed to produce excellent opium, there appeared no prospect of enlarging the scale of our operations with advantage, chiefly on account of the great difficulty and expense, which attended the operation of properly scarifying the poppy head. The discovery of an error in Mr. Ball's calculations, gave us additional discouragement; that gentleman states the produce of an acre to be 50 lb., supposing a square foot to produce one grain, whereas, on that calculation, it would only amount to between five and six pounds.

In the year 1819, we contrived the scarificator (Plate 1, fig. 1), and were so much encouraged by the increased facility afforded by its operation, as to undertake 15 poles of poppies. This little piece was selected from six acres of poppies, on account of bearing a very regular crop. It afforded employment to two women, for 9 days, who received 1*s.* per day, which made the expense of collecting, &c., 12*s.* per lb., as they procured one pound and a half of solid opium, of which we inclose a specimen. The cultivation was similar to that pursued in the two following years, we need not therefore particularize it, until we describe our progress in the year 1821. The only peculiarity was, a very fine season throughout.

In 1820 we constructed the scarificator (fig. 2), which was employed on 1 acre, 5 perches, of poppies, and was found much superior to our first contrivance, both in facility of application, and in dispatch. The process was begun, July 19, and finished August 2, producing 21*lb.*, 8*oz.*, 2*dr.*, of opium, in the recent state; which was

reduced, by evaporation, to 15*lb.*, 5*oz.*, 6*drs.* (avoirdupois) of solid opium, a specimen of which accompanies this communication. The crop was pretty perfect, but the people were hindered by frequent showers. The table, No. 1, will explain their daily progress and expense.

We will now endeavour to describe minutely, the cultivation and process employed last year.

In the beginning of February, 1821, a field measuring 4 acres, 1 rood, 35 perches, exclusive of fences, &c., which had borne two successive crops of poppies, and had received a ploughing immediately after the removal of the last, in the preceding Autumn, was ploughed a second time, and sown with seed of the *papaver somniferum,* between the 10th and 15th; the seed was the growth of the preceding year, and was drilled with 21 inch intervals. It came up by March 14th, and held out the promise of a full crop until the beginning of April, when some remarkably heavy showers of rain occurred, which made the crop extremely imperfect, intervals of from one, to twenty yards appearing all over the field. One acre was patched with potatoes, and the remainder with Swedish turnips; the former did very well, but the latter were destroyed by the fly, excepting a small residue, which was drawn in July, and transplanted, to fill up a crop of Swedes a mile distant; which, though more fortunate than these patches, had yet suffered severely from the same cause.

The intervals between the drills were hoed by the first week in May. This operation was found to require much care, in consequence of the immense number of annuals with which the land was infested. The difficulty was much diminished when the distinctive characters of the *papaver somniferum,* became familiar to the new labourers. These were soon able to distinguish the poppies from all

the weeds which bore a general resemblance, excepting the *papaver rhœas*, which puzzled them a good while. It should be observed, that the difficulty was owing, in a great measure, to the imperfection of the crop; where that was good, it derived from continuity, a character, by which it was sufficiently distinguished from the surrounding weeds.

This hoeing was best performed by the hoe, figs. 3 and 4. The common hoe was found highly objectionable; it buried the very minute poppies with mould, which the other permitted to pass through; the weeds too, were very small, and more easily destroyed by merely cutting them below their seminal leaves, than by deeper hoeing.

The poppies were next set out with the hoe, figs. 5 and 6; two boys being allowed to each hoer to pull up weeds and supernumerary poppies, to which the hoe could not be applied. The affixed paddle was found of great service in removing weeds from the off side of the row.

A space of 4 inches from plant to plant, was deemed most advantageous, because, although heads as large and as numerous might be obtained by separating the plants to a foot apart, yet their situation would be more perilous, when strong winds happened, because such weather usually, either roots up the plant, or breaks the stem just above the earth, and neither the root nor stem of a poppy loaded with six heads, are supposed to possess double the strength of one bearing three.

The setting out was finished by the latter end of May, after which, no difficulty was experienced in the management of the crop, nor any expense beyond what would have been incurred by keeping a crop of drilled beans equally clean on the same land. The hoeing was afterwards performed at 2*s*. per land; this, with hand weeding,

amounted to about 5*s*. per acre; it was repeated three, and in some parts four times after the plants were set out.

The poppies having flowered, and generally lost their petals were observed to be covered with a blueish white bloom. We had before decided, that this appearance was the proper criterion of the best time for commencing the process for extracting the opium.

Without waiting until the whole crop was ready, the operation was commenced, July 24th, in the following manner: each person was provided with a scarificator, fig. 2; a knife, fig. 7; and a receiver, fig. 8; a row was then appropriated to each person, who was directed to take a poppy head in the left hand, and twisting it towards the right, to apply the scarificator with the right hand, so as to make the incisions in a horizontal direction, near the top of the head, and to a third part of the extent of its circumference in a sunny aspect.

Twisting the head was found to expedite the operation by dividing the motion between the right hand, and the poppy, by the return of the latter to a natural position. Horizontal wounds were preferred, as tending most to retain the juice until it became coagulated, which in warm weather was effected in about 20 minutes after it had exuded. Still, drops would fall to the ground from some of the heads; to remedy this as much as possible, the incision was made near the top of the head, and the sunny aspect given to the first incision, as the most important to be early secured. The best workers were placed first, as much mischief was found to result from permitting them to pass each other, their clothes wiping the opium from their neighbours' rows.

In this manner they proceeded about two hours, when the opium which had first exuded, was found to have

acquired consistence enough to admit of being scraped off. About three-fourths of the people were then employed to scrape off the opium with their knives, occasionally transferring it to their receivers, which were tied round the waist. The scarifiers in the meantime pursuing their work, until the approach of evening or apprehension of rain, rendered it desirable to employ the whole party to finish the scraping.

In this manner, the whole piece was treated, when another incision was formed in continuation of the first, and of similar extent, the circle being completed by the third incision; when a second series was commenced just below the first, and conducted in the same manner.

This description applies to the work of the more careful people, for the novelty of the employment was, to some, a source of some little confusion. No inconvenience resulted, provided the whole row was scarified in one aspect, otherwise the scraper was extremely apt to pass many heads unnoticed.

The poppies were found to produce opium freely, until the third or fourth incision, when the quantity was observed to diminish rapidly. Nevertheless, many continued to bleed freely even to the tenth incision, proving that the poppy has the power of secreting this peculiar liquid from its common juices. This opinion is confirmed by the fact of the plant continuing to furnish opium twice as long in a wet, as in a dry season.

The opium was weighed daily, and the process continued until the produce at an estimate of 30*s*. per pound, would no longer replace the expense. For the daily collection, and weekly expense, *vide Table* 2.

The opium which had daily accumulated in a 12 gallon pan, was now found to weigh 97*lb*. 1*oz*. It was well stirred,

and evaporated in 4 large tin vessels which were placed in the sun, and occasionally moved, so as to keep the bottoms perpendicular to his rays. Two women were constantly employed to stir the surfaces which was necessary to break the film which was constantly formed either by evaporation, or absorption of oxygen from the atmosphere.

When the opium was found to be sufficiently exsiccated, it was formed into balls, as large as cocoa nuts, and then rolled in dried poppy leaves, when the weight of it was 60*lb*. 1*oz*. 4*dr*. a sample of this is inclosed.

The poppies were suffered to stand until the stalk, near the head, began to turn yellow, this was known to indicate a sufficient, though not very complete maturity of the seed. They were pulled with the root, on the 18th of August, and laid flat on the land in rows, so as to admit the dung cart on each land, to manure for a succeeding crop of turnips.

On the 25th, the heads were brittle enough to be readily crushed with the foot; and on that account were considered ready for thrashing. They were, therefore, picked from the stalks, and carried to the centre of the field, at 3*d*. per bag of 6 bushels. They were fortunately secured by a large rick cloth from the rain, which fell in abundance next day.

August 27th. The whole crop of heads was thrashed on the spot in four hours, by a machine of 4 horse power; the seed (a sample of which is sent) was separated by coarse riddles, and afterwards perfectly cleaned by a sieve just coarse enough to permit the seed to pass through, while the dust was blown away by the wind fan. The seed weighed 13 cwt. which we expect to produce 5½ gallons of oil per cwt.

The straw being removed, and the dung spread and ploughed in, the field was sown with stone turnip seeds, between the first and seventh of September. They did very well, and having been fed off with sheep, the land has received a ploughing preparatory for a *fourth* crop of poppies, which will be sown in the middle of this month after another furrow.

We now request permission to make some additional observations, which we have not been able with convenience to interweave in the preceding narrative, and which may be necessary if the paper should at any time serve as a guide to a beginner in the poppy cultivation.

The soil on which our experiments were made, is a good loam on a sandy subsoil; it had been much exhausted by perpetual white crops and other bad husbandry, when it was prepared in the Autumn of 1818 for poppies; it was then under wheat stubble, and so completely occupied with the roots of couch grass, as to form a perfect mat.

In this state it was ridged up in furrows, merely deep enough to bottom the couch grass; each furrow was then pulled separately down with rakes, containing five 6 inch teeth, this brought the couch to the surface, from whence it was carted off in immense quantities; insuperable obstacles presenting themselves to burning it on the land.

The land now appeared perfectly clean, and after another ploughing, the greater part of it was sown without manure, with white poppy seed, which survived the succeeding winter. The annuals had been allowed to shed their seeds during many preceding years, and they now came up as thick as mustard or cress in the garden; amongst these the *alsine media* (chickweed), and the *Polygonum persicaria* (knot-grass), were pre-eminent; they were destroyed by the hoe in the Spring, but each succeeding ploughing excited

an equal abundance of successors into vegetation, until last year, when this number, though still very great, was sensibly diminished. These circumstances are mentioned, to show, that although foul land is a great obstacle to the cultivation of the poppy, yet it is not an insurmountable one.

The other portion of the field was sown in the following February, with a portion of the same seed, and had a liberal allowance of manure. The Winter poppies grew very slowly until the end of May, when they obtained a decided superiority, which they preserved to the last; adding another proof to many observed before, that poppies sown in the Autumn, without manure, are superior to those sown with that advantage in the Spring.

It should, however, be known that the *papaver somniferum* will not always bear the severity of our Winter: and that hares, where they abound, will certainly eat it during the Winter.

We have observed, that poppies are cut off rather by sharp winds than by still frost, however severe. As a protection, last Autumn we drilled turnips thickly in each interval at the time of sowing (Sept. 7th); these grew up much above the poppies, which have hitherto withstood the Winter. This, however, may be accounted for by the mildness of the season, without referring to the agency of the turnips; still the experiment certainly deserves to be repeated.—This piece measures 6 roods.

The manures employed were composts of night-soil and road drift, the dung of horses and of hogs, and street manure.

The scarificators should be attended to carefully; they ought to cut deep enough to make the juice flow from each incision; but if they penetrate the cavity of the

head, much mischief is done; a channel by no means desirable is formed for the opium, while the growth of the head is checked, and the seed exposed to ruin from the rain. The smaller poppies must be examined at the first operation after each scarifier. They should be squeezed betwixt the thumb and finger, and if the wounds are too deep, the air from within the head will escape, bubbling through the milky juice.

The knives must be kept very sharp; our's were ground every morning, and finished on the hone.

The receivers should have sharp edges, the more effectually to clear the knives.

It should have been remarked, that when the scraper follows the scarifier too quickly, a fresh exudation takes place. When this happens, the children scrape them again in the morning, whilst fresh work is provided them by the scarifiers. Warm days, and parts of the day, promote the exudation greatly.

No particular application has yet been discovered for poppy oil, excepting as a vehicle for the colours of artists. The oil cake we have given to pigs with great advantage; and have information of good success from stall-feeding cattle with it; the seed itself, perhaps, contains more nutriment in a given weight than any other vegetable production.

The capsule of the poppy, after producing opium, yields, by cold infusion, an extract, of which we send a specimen; eight grains of it are fully equal to one of opium. No considerable demand for it exists;an acre produced 80*lb.* of this extract.

Notwithstanding the apparent stubborness of the poppy straw, it makes excellent manure, when well trodden in the yard, and laid in a compact head to ferment.

The quantity of opium consumed in this country, is supposed to amount to about 40 to 50,000 *lbs.* exclusive of that which is exported. This quantity, our experiments have convinced us, could be easily raised in many parts of Great Britain, where good dry land, and a superfluous population happen to exist together. On the moderate calculation of 10 *lbs.* per acre, that quantity would only require 4 or 5,000 acres of land, and 40 to 50,000 people.

As far as such a limited employment can go, a general cultivation of opium would certainly be beneficial by calling into action a description of persons not calculated for common agricultural labour, and that between hay-time and harvest. The duty of 8*s.* 8½*d.* on foreign opium, would secure a profit on opium consumed at home, as it must add at least 11*s.* per lb. to the price of the foreign.

Our experiments have taught us, that the opium season may be extended to six weeks and upwards, by one autumnal and two or three vernal sowings.

At present, scarcely any demand exists for British opium; but the article has been introduced to the attention of the College of Physicians; and should that learned body think proper to give it a place in the Pharmacopœia, the currency thereby stamped upon it, will soon bring it into use. We confidently expect, that the British will soon be sought for in preference to the foreign opium, and consequently bear a higher price. This opinion is founded on the numerous and highly favourable reports we have received from eminent medical practitioners, and confirmed by the result of our own experiment of its effects; having administered many pounds of it during the last three or four years.

To conclude, Sir, if the Society feels desirous to publish this paper, we shall be extremely ready to give more par-

ticular information, on any part which the Society may not consider sufficiently explained.

In consequence of being engaged in the cultivation of other medicinal plants, we have to regret our inability to offer the Society an account of the precise total of expense incurred last year by the cultivation of opium; we were not apprised of the Society's intentions until October. Where the expenses are stated, they may be relied upon as correct. We have omitted to state, that we calculated the deficiency in the crop, at a fourth part, and that we believe an acre may produce at a *maximum* upwards of 20 *lbs.* of opium.

We are, Sir,

&c. &c. &c.

JOHN COWLEY, *Member of the Royal College of Surgeons.*

WILLIAM STAINES, *Surgeon.*

A. Aikin, Esq.

Sec. &c. &c.

TABLE I.

Showing the daily PROGRESS and EXPENSE, in the Year 1820.

Days.	Number of Persons.	Quantity.			Expense.		
1820.		*lb.*	*oz.*	*dr.*	£.	*s.*	*d.*
July 19.	2 Women	—	4	4	—	2	—
20.	7 D°.....	—	9	—	—	7	—
21.	7 D° viz. N°. 1...	—	8	4		7	—
	— 2...	—	5	8			
	— 3...	—	5	12			
	— 4...	—	5	12			
	— 5...	—	5	8			
	— 6...	—	3	14			
	— 7...	—	—	12			
22.	11 D°.....	1	15	8	—	11	—
24.	10 D°.....	2	13	—	—	10	—
25.	11 D°.....	3	6	—	—	10	6
26.	11 D°.....	3	11	12	—	11	—
27.	11 D°.....	1	10	12	—	11	—
28.	4 D°.....	0	15	—	—	4	—
29.	4 D°.....	1	2	12	—	4	—
31.	4 D°.....	1	1	—	—	4	—
Aug. 1.	4 D°.....	0	11	4	—	4	—
2.	4 D°.....	1	—	8	—	4	—
		21	8	2	4	9	6

TABLE II.

Showing the daily PROGRESS and weekly EXPENSE in the Year 1821, with the general state of the Weather.

Days.	Weather.	Quantity.			Expense.		
1821.		*lb.*	*oz.*	*dr.*	£.	*s.*	*d.*
July 24.	Showery	5	1	—	—	—	—
25.	D°.....	9	—	—	—	—	—
26.	D°.....	11	—	—	—	—	—
27.	D°.....	14	—	—	—	—	—
28.	Fine all day.....	14	—	—	8	13	1½
30.	Showery	5	—	—	—	—	—
31.	Constant Showers ...	7	—	—	—	—	—
Aug. 1.	Fine	7	8	—	—	—	—
2.	Showery	4	12	—	—	—	—
3.	Hot and dry	8	—	—	—	—	—
4.	Fine.....	2	12	—	15	1	6½
6.	Tolerably d°	2	12	—	—	—	—
7.	Fine	4	8	—	—	—	—
8.	Rained hard all day...	—	—	—	—	—	—
9.	Showery	1	12	—	7	16	6½
		97	1	—	31	11	2½

SIR; Winslow, April 15th, 1822.

IN reply to your letter, of the 16th ult. requesting "a particular account of the method of constructing the scarificator" employed by us, we transmit to you the following particulars:

Entirely unused, however, to describe mechanical operations, we rely on your pardon, if through our anxiety to be sufficiently particular, we risk the misfortune of becoming somewhat tedious; we do so with the more confidence, from an impression that your memory will present

you with instances, in which descriptions of very simple operations, have been rendered perfectly unintelligible, by want of attention merely to minutiæ.

We send you the only two instruments employed in the construction of scarificators, that are possessed of any peculiarity. The other requisites consist of a small step grind-stone (if with an apparatus for supplying water, much the better), a bench with a small vice affixed, and a light hammer.

With respect to the most proper kinds of wood, our experience only enables us to speak of three; beech, mahogany and oak. Of these, beech is considerably the best; having a mixed grain, it holds the blades with much tenacity: mahogany can be worked with more facility than beech, but wanting the transverse fibres of the latter, it is less tenacious of the steel: oak holds the blade with sufficient firmness, but the direction of its longitudinal fibres, is very uncertain and irregular; hence it often happens, perhaps when the instrument is nearly finished, that a blade is thrown out of its proper course, and the whole by that means rendered useless; this quality renders the employment of oak very objectionable.

It should be observed, that scarificators of one dimension, are sufficient for poppies of all sizes, the elasticity of their capsules permitting them to adapt themselves to the figures of the scarificators; the latter should, however, be so constructed as to fit a poppy of an average size, in order to equalize the difficulty of accommodating them to the two extremes. The medium of size, we believe, is occupied by capsules two inches and a half in diameter; on which account, the faces of our scarificators are formed of segments of a circle of that diameter.

The hafts are furnished by the carpenter, plain, at 1*s.* 6*d.*

per dozen; in this state they are supposed to be, at the commencement of our description of the construction of scarificators.

The first thing to be done is, to give to the part into which the steel teeth are subsequently to be inserted, a curve, corresponding with the arc of a circle, two inches and a half in diameter (see the left-hand figure 2, Plate I.): then, by means of a fine saw, made of watch-spring, make five equidistant cuts in the head of the handle, in a longitudinal direction, for the reception of the blades.

In order to save the great expense of forging and finishing a number of so small blades, we have been induced to employ broken watch-springs, for their formation, and have found them answer extremely well:—The manner of using them is as follows:—

A spring is to be brought to an edge by the grindstone, continually moving it, if the stone be dry; about one-sixth of an inch is then to be broken off with the pliers (assisted by firm pressure with the thumb) in an oblique direction, so as to leave the end of the spring possessed of an angle of forty-five degrees; the irregularities of the fracture are to be ground off, wetting the point frequently if the stone be dry, to avoid such an increase of temperature as would destroy the blue temper of the steel.

After the grindstone the hone must be used, to finish about as much of the point as is intended to project from the wood.

The handle is now to be fixed in the vice, and the spring (being previously wetted at the end with water) to be gently driven by means of a light hammer, into one of the cuts previously made by the saw, allowing the sharpened point to project about one-thirtieth part of an inch; the remainder of the spring is then to be broken off, by pressing

it with the thumb firmly down to the wood, close to which it should separate with an even fracture. The blades being thus successively fixed, the hammer must be employed to batter down the wood gently about them. The end and back being then applied slightly to the grindstone, the scarificator will be finished, and, notwithstanding the apparent slightness of the attachment, not one blade in a hundred will become loose.

If mahogany be used, a little sulphuric acid should be added to the water into which the blade is dipped previous to its insertion into the wood, and as soon as finished, must be placed with its head in a mixture of chalk and water, in order to neutralize the acid, which would otherwise attack the points and edges of the blades.

We should have stated, in our first communication, that two scarificators should be provided for each person; distributing the second supply, when the capsules become (as they will) somewhat tough; an industrious person, in a dry season, will even wear out three of these implements.

I am, Sir,

A. Aikin, Esq. &c. &c. &c.

Sec, &c. &c. Wm. Blow Staines.

CERTIFICATES.

Winslow, February 2nd, 1822.

I do hereby certify, that Messrs. J. Cowley, and W. B. Staines, obtained, in the year 1821, sixty pounds and one ounce, of solid opium, from the *papaver somniferum* raised

by them in this parish, and that the whole of it was in every respect equal to the specimen, No. 12.

I am, Sir,

A. Aikin, Esq. &c. &c. &c.

Sec., &c. &c. C. KIPLING.

SIR; Harley-street, February 5, 1822.

I BEG leave to certify, that I have made frequent trials of the English opium, prepared by Messrs. Cowley and Staines, at Winslow, Bucks, and that I am convinced it will do every thing that we usually expect from the use of foreign opium.

I am, Sir,

&c. &c. &c,

J. LATHAM.

2, Newman's-row, Lincoln's-Inn-fields.

SIR; 5th February, 1822.

I TRUST I am not departing from the regulations of the Society for the Encouragement of Arts, Manufactures, and Commerce, in requesting you to lay before it, my testimony in favour of the English opium cultivated by Mr. Cowley, of Winslow, in Buckinghamshire.

I have been in the habit of prescribing it in my own practice for upwards of twelve months, and am satisfied that its properties are, in every respect, equal to those possessed by foreign opium, and that its purity is greater than that of foreign opium.

It may likewise be necessary I should state, that I have furnished two persons, the one with opium, and the other with tincture of opium, who have, for some years, been in the constant habit of taking it in those forms. By the former (a labouring man), I have

been told, that he cannot distinguish any difference between the effects of it, and of foreign-opium; whilst the latter, a gentleman of considerable literary attainments, and whose papers on the subject of opium-eating, contained in the London Magazine, of September and October last, will show how far his opinion is entitled to attention, this gentleman has distinctly stated, that he has failed to produce the same effects with one hundred drops of the tincture, made from Turkey opium, as those which he had previously produced, by the same quantity of tincture made with Mr. Cowley's opium. In laying these facts before the Society, I consider I am but performing a duty.

I am, Sir,

A. Aikin, Esq. &c. &c. &c.

Sec. &c. &c. THO. CLARKE, *Surgeon, &c.*

28, Parker Row, Dockhead,
November 5th, 1821.

GENTLEMEN;

I RECEIVED your communication respecting the British opium, but was prevented by professional engagements from giving you an earlier answer, which I should otherwise have cheerfully done.

I have employed scarcely any foreign opium these last six months, when I began with yours, excepting in physical prescriptions, and have used nearly the four pounds I received of you, in my practice.

Your inquiries as to the result of my experience of the medical properties of it, I feel enabled to answer with confidence, for the obvious importance of the subject has led me to a careful observation of its effects.

My opinion is, that your opium is in no respect inferior to the best Turkey opium. I consider it far superior to the

greater part imported. Its extraordinary purity must be, and is, very much in its favour; the foreign is evidently a very heterogeneous mass, perhaps partially from the slovenly mode of collecting it, and partially from adulteration, the comparison of different specimens will demonstrate that it is so in various and uncertain degrees; on the last account, I believe, the employment of your opium is likely to be most advantageous, being more uniform and certain. It is my opinion, however, that the sanction of the College of Physicians will be necessary, to give it the requisite degree of currency with the profession.

I perfectly agree with you respecting the national advantage likely to be derived from the extended cultivation of opium in this kingdom, for although I cannot pretend to extensive knowledge of the comparative advantages of foreign and domestic trade, I yet venture to suppose, that British capital can no where be better laid out than in the employment of British subjects, in a way peculiarly suited to such as are too old, too young, or too weak, for common agricultural labour.

I remain,

&c. &c. &c.

Z. Dunkin.

P.S. If these few observations can be any way serviceable to you, use them at your pleasure.

Brackley, December 1st, 1821.

I have tried the opium prepared by Mr. Cowley, of Winslow, and find it in effect, equal to the finest Turkey.

Frederick Gee.

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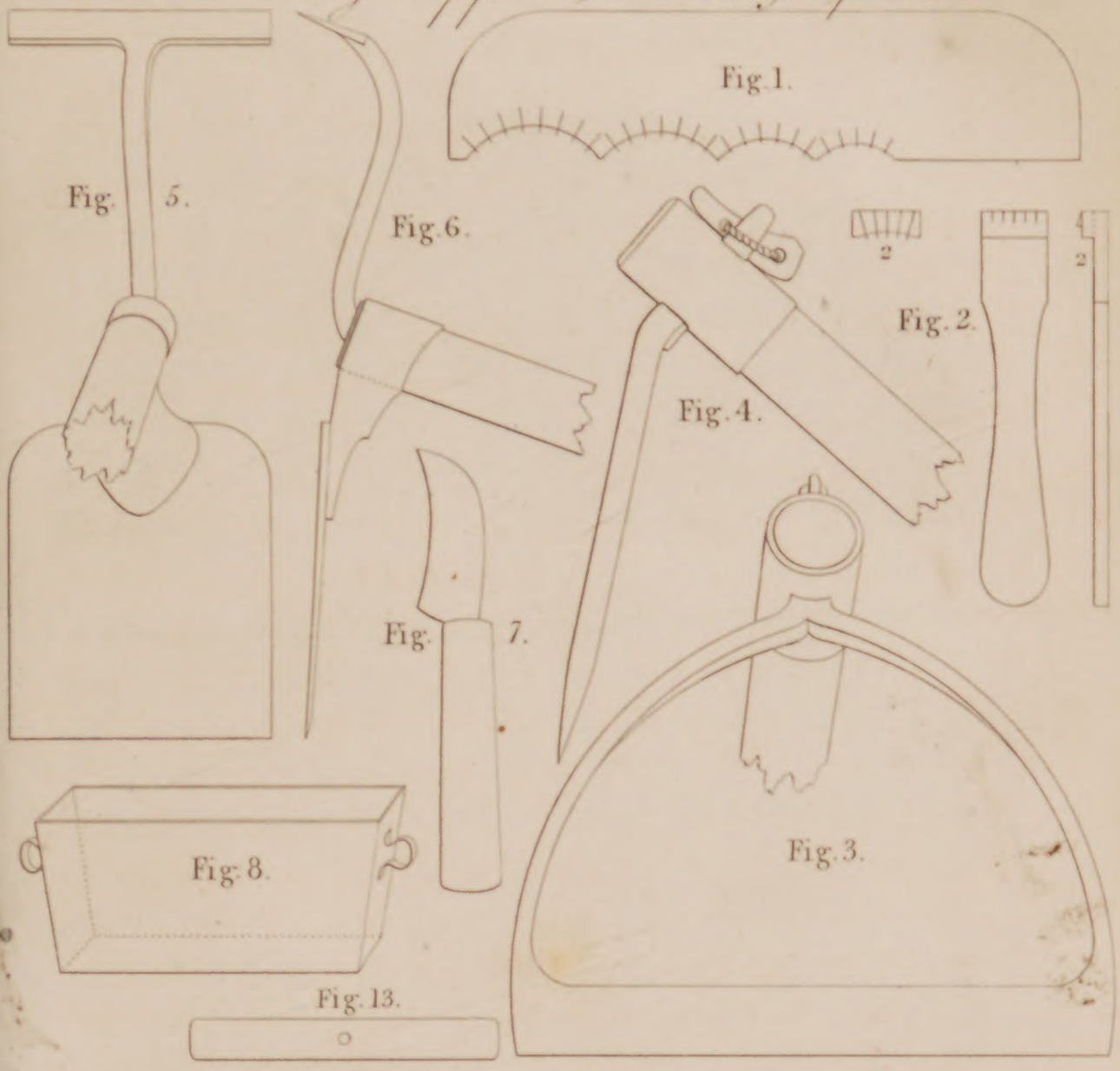
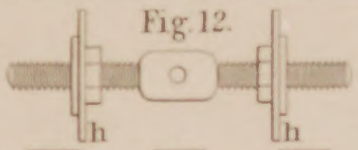
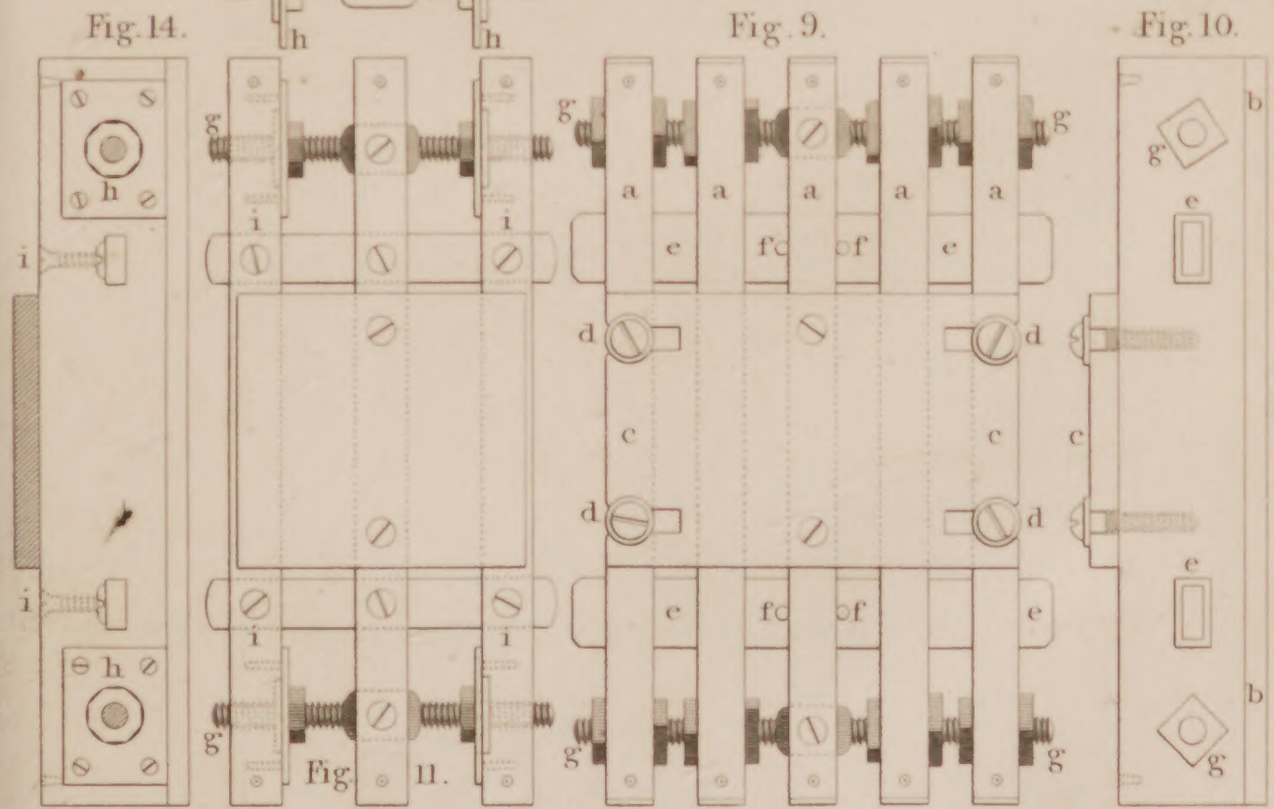
Mess.rs Cowley & Staines's Instruments for cultivating Poppies & collecting Opium. Pl.1.







Mr. Marshall's Blocks for Calico Printers.

C. Varley del.t

W. Kidsall sc.

13, Bedford Row, February 5th, 1822.

I BEG leave to state to the Society of Arts, &c., that I have both ordered the use of Mr. Cowley's opium in my own practice, and recommended its employment to others; and that both myself and friends have found it *at the very least*, equal in efficacy to the opium met with in the shops. Indeed, we have rather thought it to possess superior power to the common Turkey opium.

DAVID UWINS, M.D.

N° III.

PRESERVING TURNIPS DURING THE WINTER.

The large GOLD MEDAL, *the premium offered, was this Session presented to Messrs.* COWLEY *and* STAINES, *Surgeons, Winslow, Bucks, for their successful method of preserving the* ROOTS OF TURNIPS *in a state fit for feeding cattle therewith, during the months of February, March, and April. The following communication has been received from the Candidates, on the subject.*

Winslow,
April 27th, 1822.

SIR;

THE purport of the following paper is, to communicate to you, for the consideration of the Society of Arts, a method we have successfully employed for the preservation of turnips during the last Winter; in consequence of

which, we request permission to offer ourselves as candidates for the Society's premium, No. 35, for the "Preservation of Vegetable Produce."

The two fields in which our turnips were sown, measured (as will be seen by Mr. King's survey) four acres and upwards, exclusive of fences, &c. The soil in both is a dry loam, and was in good condition, although not manured for the turnips; two ploughings only were allowed, one in the preceding Autumn, the other in the Spring.

Between the 10th and 15th of last May, the seed was deposited in drills 21 inches apart, and we think about one deep. Very nearly ten pounds of seed were used, with hopes that enough plants might escape the turnip-fly. The seed came up very favourably, in great abundance, yet the fly, which soon commenced its ravages, destroyed so many, that it was necessary to procure plants from other quarters, before all the vacancies could be filled by transplanting; this was performed between the 3rd and 7th of July, with favourable showers, but was rendered partly abortive by dry weather immediately succeeding the last day of planting, so that, eventually, the crop was considerably imperfect.

On the 10th of November, we began pulling the turnips which were all carted home before the end of that month, and the land immediately sown with wheat, which now promises extremely well. The crop was removed thus early, in order to demonstrate that our plan would permit wheat to succeed the turnips, and with the hope of influencing the Society in its favour on that account.

A man and two boys were next employed to cut off the tops, leaving the roots undisturbed, with particular instructions not to remove the crown, or any part of the